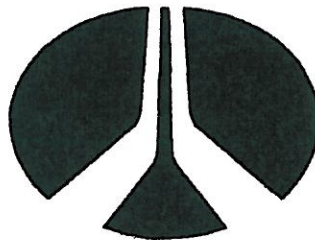


Interim Status Closure Plan Solid Waste Management Unit 53

For U.S. D.O.E. -Rocky Flats Plant
Transuranic Mixed Wastes

CO7890010526

1 April 1989



Rockwell International

Not For Public Dissemination

May contain unclassified controlled nuclear information
subject to section 149 of the Atomic Energy Act of 1954,
as amended (42 USC 2169)

Approval by the Department of Energy prior to release is required

Reviewed for Classification/UCNI/OUO
By: Janet Nesheim, Derivative Classifier
DOE, EMCBC
Date: 10-28-08
Confirmed Unclassified, Not UCNI/Not OUO

Reviewed for Classification
by Barbara Kerr Greer
Date: April 1, 1989 -UCNI

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ADMIN RECORD

A-SW-000369

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Date: 4/1/90

RRRES CONTROL
JTGOING LTR NO

Rocky Flats Plant
Aerospace Operations
Rockwell International Corporation
P O Box 464
Golden Colorado 80402-0464
(303) 966-7000



Rockwell
International

Contractor to U S Department of Energy

March 30, 1989

89-RF-1143

Albert E. Whiteman
Area Manager
DOE, RFAO

CLOSURE PLANS FOR UNITS 53 AND 60

Attn: K. J. Schneider

Please find enclosed six copies each of the above referenced closure plans. These closure plans meet the DOE/Rockwell commitments to the Colorado Department of Health (CDH) to submit closure plans for Units 53 and 60 by April 1, 1989.

Both these units were identified in the RCRA Part B Permit Application for Transuranic (TRU) Mixed Wastes. The closure plan for Unit 53 does not include Room 3305, as originally identified in the Part B Permit Application, as no TRU waste cementation treatment operations were ever conducted there.

Should you have any additional questions please contact Michael Arndt at extension 4294.


K. B. McKinley
RCRA/CERCLA Program

Orig. and 1 cc - A. E. Whiteman
Enc.

Reviewed for Classification/UCNI/OUO
By: Janet Nesheim, Derivative Classifier
DOE, EMCBC
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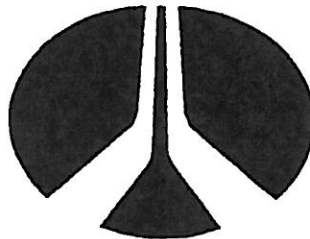
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Interim Status Closure Plan Solid Waste Management Unit 53

For U.S. D.O.E. - Rocky Flats Plant
Transuranic Mixed Wastes

CO7890010526

1 April 1989



Rockwell International

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CO7890010526

REGULATORY CHECKLIST FOR UNIT 53, BUILDINGS 371 AND 771
TREATMENT AND STORAGE FACILITY

6 CCR 1007-3 PART/REQUIREMENT	[40 CFR] [SECTION]	CLOSURE PLAN SECTION
----------------------------------	-----------------------	-------------------------

Closure Performance Standard

265.111 [265.111]

3.1

The owner or operator must close his facility in a manner that:

- a. Minimizes the need for further maintenance; and
- b. Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface water or to the atmosphere; and
- c. Complies with the closure requirements of this Subpart including, but not limited to the requirements of Sections 265.197, 265.228, 265.258, 265.280, 265.310, 265.351, 265.381, and 265.404.

Detailed Description of Steps Necessary to Close the Treatment/Storage Facility:
265.112(b)1 [265.112(b)1]

3.2, 4.0 5.0,
6.0, 7.0

Content of Plan. The plan must identify the steps necessary to perform partial and/or final closure of the facility at any point during its active life. The closure plan must include, at least:

1. A description of how each hazardous waste management unit at the facility will be closed in accordance with Section 265.111; and

Identification of Maximum Extent of Operation of the Treatment/Storage Facility: 2.2
265.112(b)2 [265.112(b)2]

2. A description of how final closure of the facility will be conducted in accordance with Section 265.111. The description must identify the maximum extent of the operations which will be unclosed during the active life of the facility; and

Removal and Management of Hazardous Wastes:

Estimate of Maximum Inventory of Hazardous Waste in the Treatment/Storage Facility: 2.2.2
265.112(b)3 [265.112(b)3]

3. An estimate of the maximum inventory of hazardous wastes ever on-site over the active life of the facility and a detailed description of the methods to be used during partial closures and final closure, including, but not limited to, methods for removing, transporting, treating, storing, or disposing of all hazardous wastes, and identification of the types(s) of the off-site hazardous waste management units to be used, if applicable; and

Detailed Description of Removal of Hazardous Waste Inventory: 4.0
265.112(b)3 [265.112(b)3]

265.114 [265.114] 4.0

When closure is completed, all facility equipment and structures must have been properly disposed of, or decontaminated by removing all hazardous waste and residues.

Identification and Type of Off-Site Hazardous Waste Management Unit(s): 5.0
265.112(b)3 [265.112(b)3]

Decontamination and Removal of Hazardous Waste Residues:Criteria for Determining the Extent of Decontamination Necessary:

265.112(b)4

[265.112(b)4]

6.1

A detailed description of the steps needed to remove or decontaminate all hazardous waste residues and contaminated containment system components, equipment, structures, and soils during partial and final closure, including but not limited to, procedures for cleaning equipment and removing contaminated soils, methods for sampling and testing surrounding soils, and criteria for determining the extent of decontamination necessary to satisfy the closure performance standard;

265.404

[265.404]

At closure, all hazardous waste and hazardous waste residues must be removed from treatment processes or equipment, discharge control equipment, and discharge confinement structures.

Detailed Description of Decontamination Steps:

265.112(b)4

[265.112(b)4]

6.0

265.404

[265.404]

Procedures for Cleaning Equipment and Structures and Removing Contaminated Soils, and Detailed Description of Decontamination:

265.112(b)4

[265.112(b)4]

6.0

265.404

[265.404]

265.114

[265.114]

CLOSURE PLAN
SECTION

6 CCR 1007-3 [40 CFR]
PART/REQUIREMENT [SECTION]

A Detailed Description of Removal of Contaminated Equipment and Hazardous Waste

Residues:		
265.112(b)4	[265.112(b)4]	6.3, 6.4, 6.6
265.404	[265.404]	
265.114	[265.114]	

Methods for Sampling and Testing to Demonstrate Success of Decontamination:

265.112(b)4	[265.112(b)4]	7.0
265.404	[265.404]	
265.114	[265.114]	

Detailed Closure Schedule:

265.112(b)6	[265.112(b)6]	8.0
-------------	---------------	-----

A schedule for closure of each hazardous waste management unit and for final closure of the facility. The schedule must include, at a minimum, the total time required to close each hazardous waste management unit and the time required for intervening closure activities which will allow tracking of the progress of partial and final closure. (For example, in the case of a landfill unit, estimates of the time required to treat or dispose of all hazardous waste inventory and of the time required to place a final cover must be included.);

Time Allowed for Closure:

265.113b	[265.113b]	8.0
----------	------------	-----

The owner or operator must complete closure activities in accordance with the approved closure plan and within 180 days after receiving the final volume of wastes or 180 days after approval of the closure plan, if that is later. The Department may approve a longer closure period using the procedures under 265.112(c) if the owner or operator demonstrates that;

- 1.i. The closure activities will, of necessity, take him longer than 180 days to complete;
- ii.A. The facility has the capacity to receive additional waste;
- B. There is a reasonable likelihood that a person other than the owner or operator will recommence operation of the site;
- C. Closure of the facility would be incompatible with continued operation of the site; and
2. He has taken and will continue to take all steps to prevent threats to human health and the environment from the unclosed but inactive facility.

Certification of Closure:
265.115

[265.115]

13.0

x

Certification of Closure. When closure is completed, the owner or operator must submit to the Department certification both by the owner or operator and by an independent registered professional engineer that the facility has been closed in accordance with the specifications in the approved closure plan.

Closure Cost Estimates, Financial Assurance and Liability Coverage:
266.12

[265.142]

9.0

- a. The owner or operator must prepare a written estimate, in current dollars, of the cost of closing the facility in accordance with the closure plan as specified in 264.112. The closure cost estimates must equal the cost of closure at the point in the facility's operating life when the extent and manner of its operation would make closure the most expensive, as indicated by its closure plan.

- b. During the operating life of the facility, the owner or operator must adjust annually the closure cost estimates. The adjustment must be made using an inflation factor derived from the annual Implicit Price Deflator for Gross National Product as published by the U.S. Department of Commerce in its Survey of Current Business. The inflation factor is the result of dividing the latest published annual deflator by the deflator for the previous year. Adjustments to the cost estimates are made by multiplying the latest closure cost estimate by the latest inflation factor. Facilities using a financial mechanism other than the financial test or corporate guarantee should use the deflator published closed to the anniversary date of the instrument. Facilities using the financial test or corporate guarantee should use the deflator published nearest the fiscal year end reporting date required by 266.14(i)5. The adjust closure cost (ACC) estimate is calculated as follows:

x ACC=CCC x IF

ACC= Adjusted closure cost,

CCC= Current closure cost estimate as determined in paragraph (a) above.

IF = Inflation factor = LPD/PYD

LPD= Latest published Deflator

PYD= Previous year's Deflator

- c. The owner or operator must revise the closure cost estimate whenever a change in the closure plan increases the cost of closure. The revised closure cost estimate must be adjusted for inflation as specified in 266.12(b)
- d. The owner or operator must keep the following at the facility during the operating life of the facility: The latest closure cost estimate prepared in accordance with 255.12(a) and (c) and, when this estimate has been adjusted in accordance with 266.23(b), the latest adjusted closure cost estimate.

**INTERIM STATUS CLOSURE PLAN FOR
SOLID WASTE MANAGEMENT UNIT NO. 53**

1.0 INTRODUCTION

1.1 Plant Location and Mission

The U.S. Department of Energy's Rocky Flats Plant is located in north-central Colorado, northwest of the City of Denver (Figure 1). The Plant is located in Sections 1 through 4 and 9 through 15 of T.1 S., R. 70 W. The facility's EPA identification number is CO 7890010526. The mailing address is:

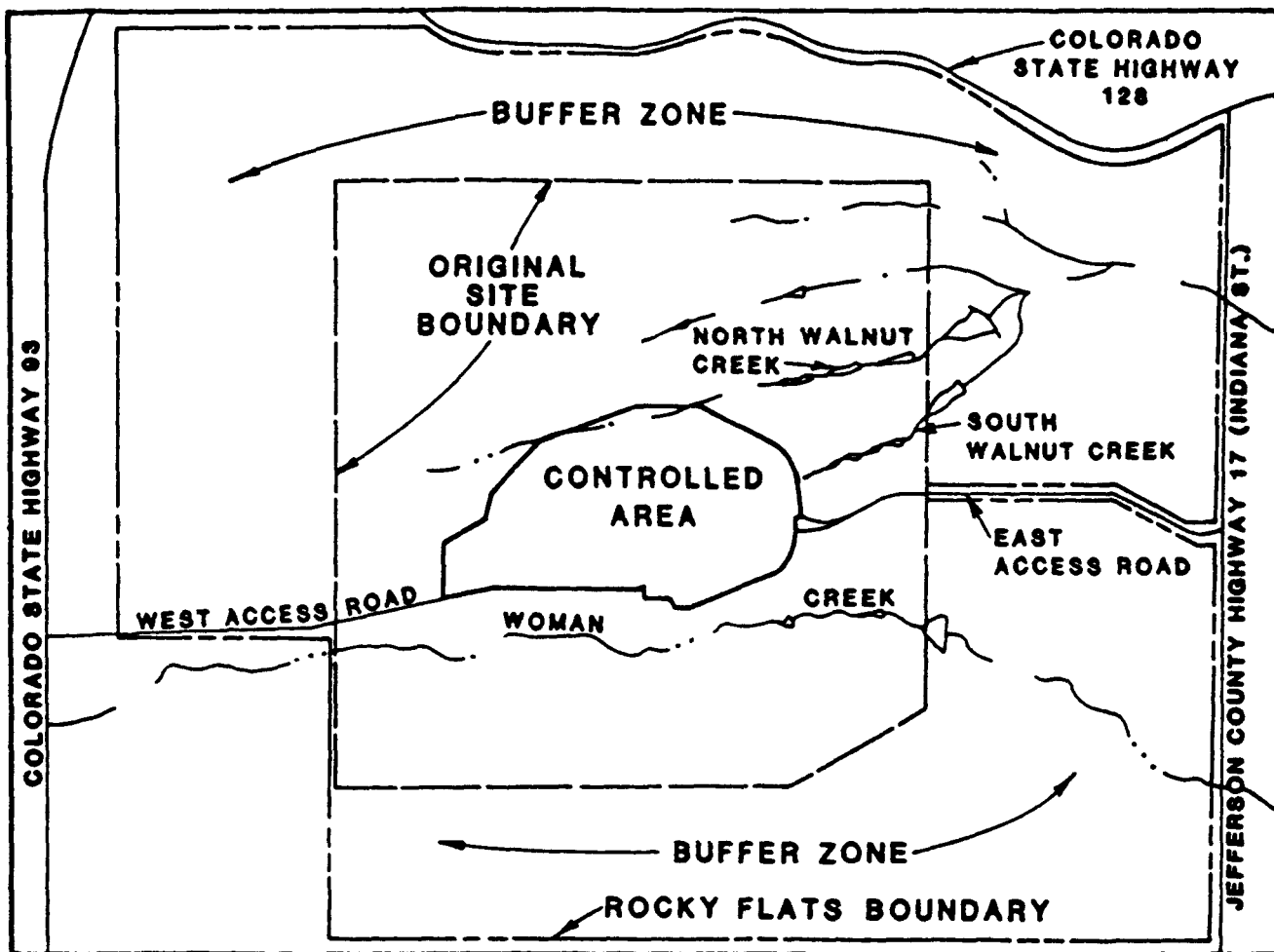
U.S. Department of Energy
Rocky Flats Plant
P.O. Box 928
Golden, CO 80402

The facility contact is:

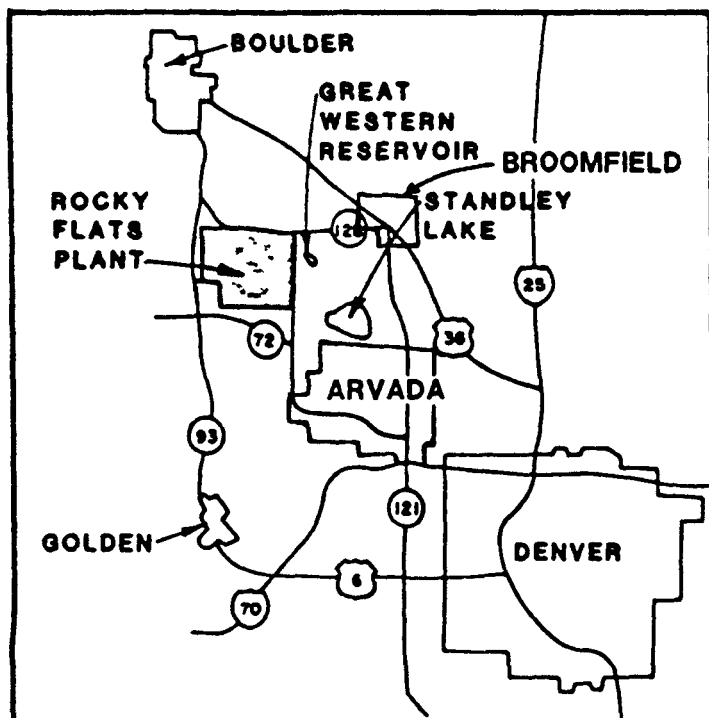
Mr. Albert E. Whiteman, Area Manager
Phone: 303-966-2025

Rockwell International is the prime operating contractor for Rocky Flats Plant (since June 1975) under the general direction of the U.S. Department of Energy (DOE), Albuquerque Operations Office. As a government-owned and contractor-operated facility, the Rocky Flats Plant comprises a portion of the nationwide nuclear weapons production complex.

The primary Plant mission is to produce plutonium components for nuclear weapons. Plutonium, uranium, beryllium, and stainless steel parts are fabricated at the Plant and shipped off-site for final assembly. Additional activities include chemical processing to




APPROXIMATE SCALE 1"=3,300'



APPROXIMATE SCALE 1"=40,000'



VICINITY MAP



UNIT 53
INTERIM STATUS CLOSURE PLAN
ROCKY FLATS PLANT
GOLDEN, COLORADO

FIGURE 1

recover plutonium from scrap material, metallurgical research and development, machining, assembly, non-destructive testing, coatings, remote engineering, chemistry, and physics. Waste handling operations at the Rocky Flats Plant include storage, transport, treatment, and packaging of waste materials generated on-site. The waste forms that are handled include hazardous chemical waste, transuranic (TRU) waste, and non-hazardous, non-radioactive waste. Specifically, this Interim Status Closure Plan addresses the treatment and storage of TRU mixed waste.

1.2 Interim Status Closure Plan Purpose

Submittal of a closure plan is required to delete facilities from the Resource Conservation and Recovery Act (RCRA) Part B Permit Application. As a portion of the RCRA compliance activities at the Rocky Flats Plant, closure plans are appended to the Post-Closure Care Permit.

The intent of this plan is to provide for closure of Unit 53 in Building 771, Room 114, and Building 371, Room 2325 in compliance with Part 265 closure regulations and in accordance with the Compliance Agreement entered into by the U.S. Environmental Protection Agency (EPA), DOE, and Colorado Department of Health (CDH). This plan addresses Colorado Hazardous Waste Regulations under CHWR 265, Subpart G, Closure and Post-Closure; Section 265, Subpart Q, Chemical, Physical, and Biological Treatment; Section 265, Subpart I, Use and Management of Containers, and equivalent Federal regulations.

2.0 FACILITY DESCRIPTION

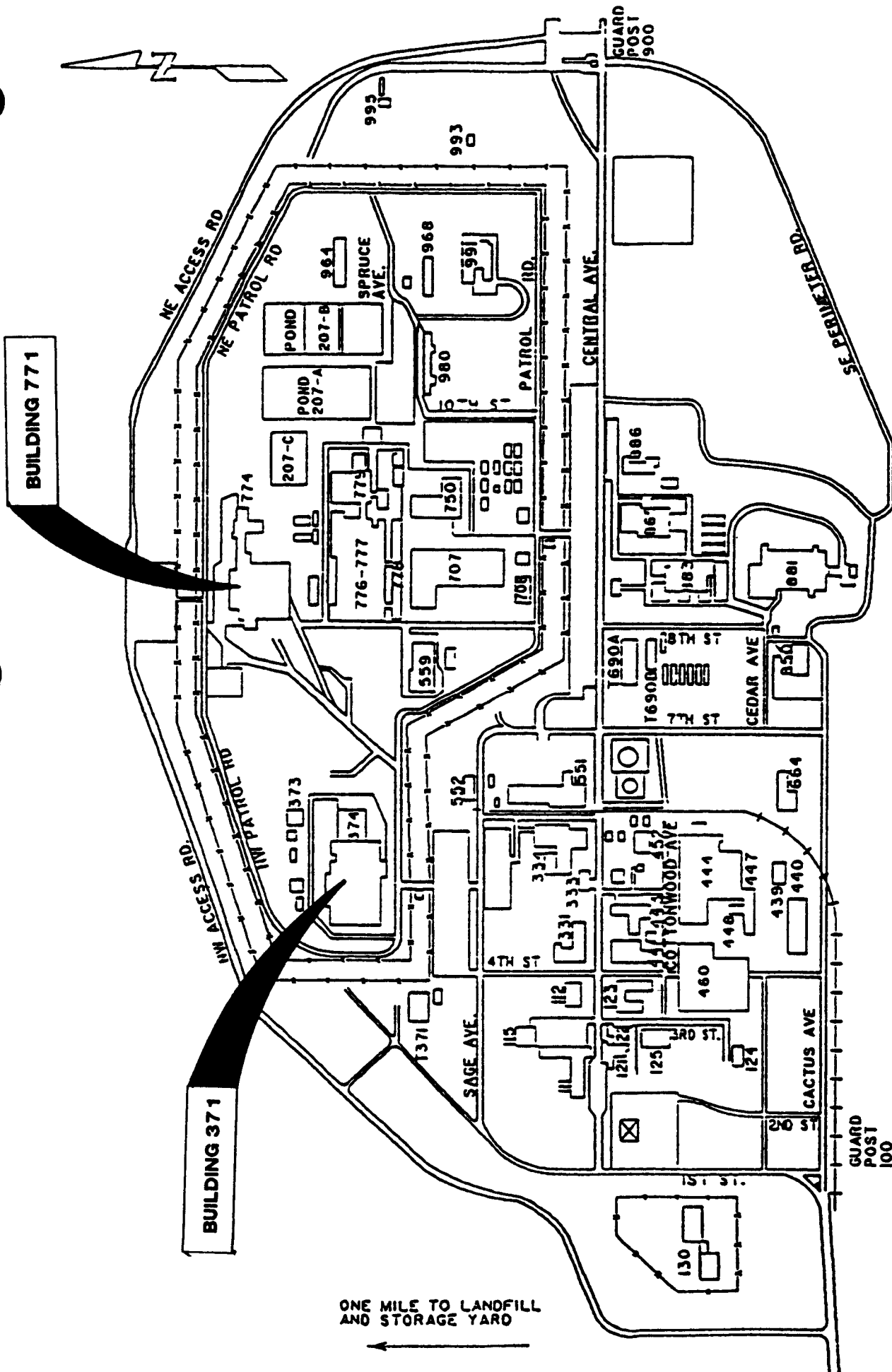
2.1 Facility Location and Specifications

2.1.1 Building 771, Room 114

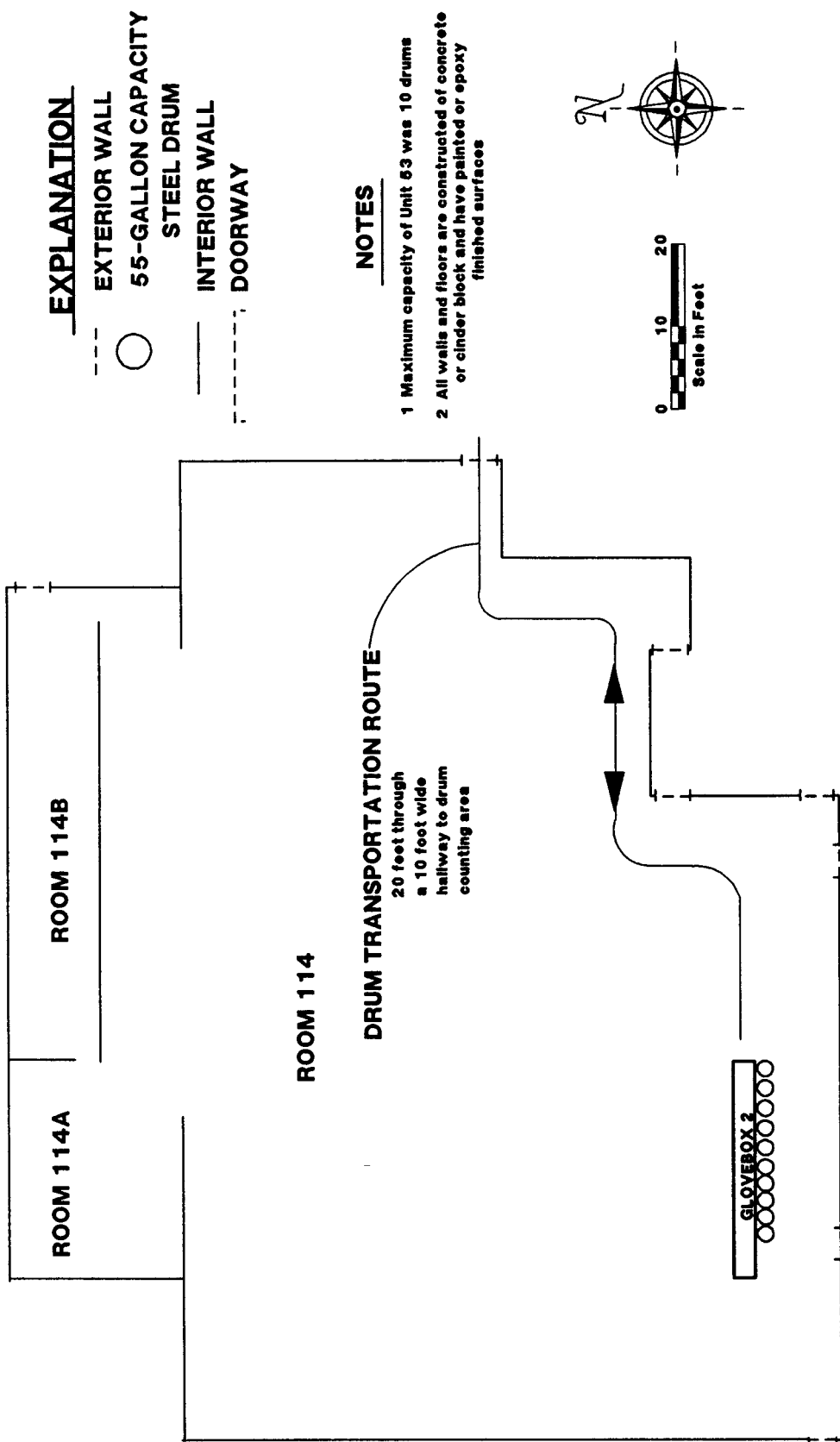
Building 771 is located in the northcentral portion of the controlled area (Figure 2). Room 114, which contains Glovebox 2 and drum storage for waste prior to processing, is on the ground floor a few feet above grade in Building 771. Room 114 is rectangular, measuring 120 feet by 80 feet, with epoxy-painted concrete floor and cinder block walls, and a 16-foot high ceiling. The drum storage section of Room 114 measures approximately 22 feet by 3 feet. Considerable amounts of mechanical equipment and ductwork are present above a height of 8 feet. A site plan, showing the room layout and glovebox dimensions, is provided in Figure 3.

2.1.2 Building 371, Room 2325

Building 371 is located in the northwest portion of the controlled area (Figure 2). Room 2325, which contains five gloveboxes (Nos. 7 through 10, and No. 12) and drum storage for waste prior to processing, is in the basement of Building 371. Room 2325 is approximately 65-feet square, with epoxy-painted concrete floor and cinder block walls, and a 16-foot high ceiling. The drum storage section of Room 2325 had a caged area measuring approximately 41 feet by 21.5 feet. The cage, consisting of chain link fence, was built in November 1986 for storage, but is no longer in place. Considerable amounts of mechanical equipment and ductwork are present above a height of 8 feet. A site plan, showing the room layout and glovebox dimensions, is provided in Figure 4.



ROCKY FLATS PLANT CONTROLLED AREA



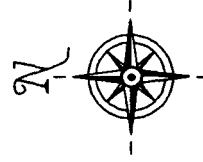
SITE PLAN
UNIT 53, ROOM 114, BUILDING 771

EXPLANATION

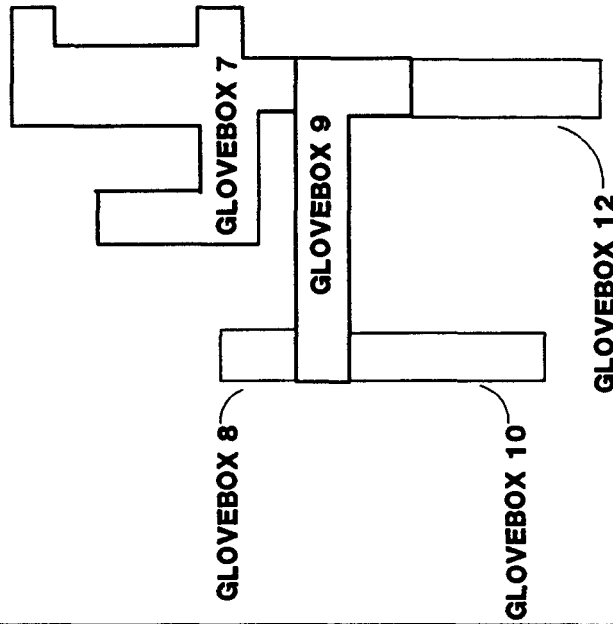
- EXTERIOR WALL
- 55-GALLON CAPACITY STEEL DRUM
- CAGED AREA
- INTERIOR WALL
- DOORWAY

NOTES

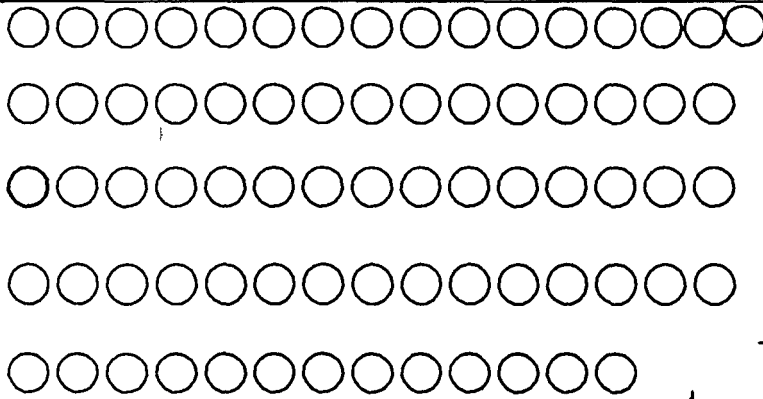
- 1 Maximum capacity of Unit 53 was 160 drums (76 drums by 2 high)
- 2 All walls and floors are constructed of concrete or cinder block and have painted or epoxy finished surfaces



ROOM 2325



DRUM TRANSPORT ROUTE
40 feet through a 10 foot wide
hallway to elevator No 1



SITE PLAN

UNIT 53, ROOM 2325, BUILDING 371



UNITS 53
INTERIM STATUS CLOSURE PLAN
ROCKY FLATS PLANT
GOLDEN, COLORADO

FIGURE 4

2.2 Facility Operation

2.2.1 Periods of Operation

Building 771, Room 114

From approximately 1970 through the spring of 1985, raw mixed waste was combined with a cement mixture in Glovebox 2, Room 114, Building 771. This process, referred to as cementation, was part of a waste stabilization and solidification program. Following the cessation of cementation activities in the spring of 1985, the glovebox was cleaned out and the material inside was packaged as contaminated material and, if the activity count associated with the contents of the drum was low, disposed as mixed waste. If the activity count associated with the contents of the drum was high, the waste was recycled for plutonium recovery. Since the spring of 1985, there have been no cementation activities at Building 771, nor is cementation currently planned for the future.

Waste awaiting treatment in Glovebox 2 was held temporarily in Room 114 from approximately 1970 until the spring of 1985.

Building 371, Room 2325

From January 1986 through approximately April 1987, raw mixed waste was combined with a cement mixture in Gloveboxes 7 and 9, Room 2325, Building 371. This process, referred to as cementation, was part of a waste stabilization and solidification program. Following the cessation of cementation activities in April 1987, the gloveboxes were cleaned out and the material inside was packaged as contaminated material and, if the activity count associated with the contents of the drum was low, disposed as mixed waste. If the activity count associated with the contents of the drum was high, the waste was recycled for plutonium recovery. As of April 1987, there have been no cementation activities at Building 371, nor is cementation currently planned for the future.

Waste awaiting treatment in Gloveboxes 7 and 9 was stored in Room 2325 from January 1987 until April/May of 1988. These drums likely were stored in this area for more than 90 days as of April 1987.

2.2.2. Maximum Waste Inventory

Building 771, Room 114

The maximum waste holding capacity of Unit 53, Building 771 was 10 steel drums of 55 gallon capacity each, or 550 gallons of solid waste. The maximum quantity of waste held in Unit 53 was four drums, or 220 gallons of solid waste. Approximately one-half drum of raw waste was treated during each treatment event.

Building 371, Room 2325

The maximum waste storage capacity and the maximum quantity of waste stored in Unit 53, Building 371 was 150 steel drums of 55 gallon capacity each, or 8250 gallons of solid waste. Approximately one-half drum of raw waste was treated during each treatment event, per glovebox.

2.2.3 Types of Waste Managed

Unit 53 was used to treat and store TRU mixed solid wastes, including incinerator ash and sludge, ion exchange resin, and filter sludge of which ion exchange resins and incinerator ash/sludge are acidic. Table 1 identifies the wastes approved for treatment in Unit 53 along with corresponding EPA Hazardous Waste Numbers and Item Description Codes (IDCs). The IDC identifies the physical and chemical form of the TRU material in process, and is used to account for materials throughout the Plant. TRU mixed wastes are defined as hazardous wastes exhibiting alpha activity greater than 100 nanocuries per gram and having radionuclides with atomic numbers higher than uranium. The following maximum concentrations of hazardous constituents were found to occur in TRU

TABLE 1
WASTES APPROVED FOR TREATMENT IN UNIT 53

ITEM DESCRIPTION CODE	DESCRIPTION	EPA HAZARDOUS WASTE NUMBER
311	Graphite Heels and Fines	None
372	Grit	None
373	Firebrick Heels and Fines	D004, D006, D007
378	Firebrick, pulverized	D004, D006, D007
393	Sand, Slag and Crucible Heels	None
420	Incinerator Ash	F001, F002, F003
421	Ash Heel	D004, D006, D007
423	Soot and Soot Heels	D002, D006, D007
430	Ion Exchange Resin	D002, F001, F002
431	Ion Exchange Resin	D002, F001, F002

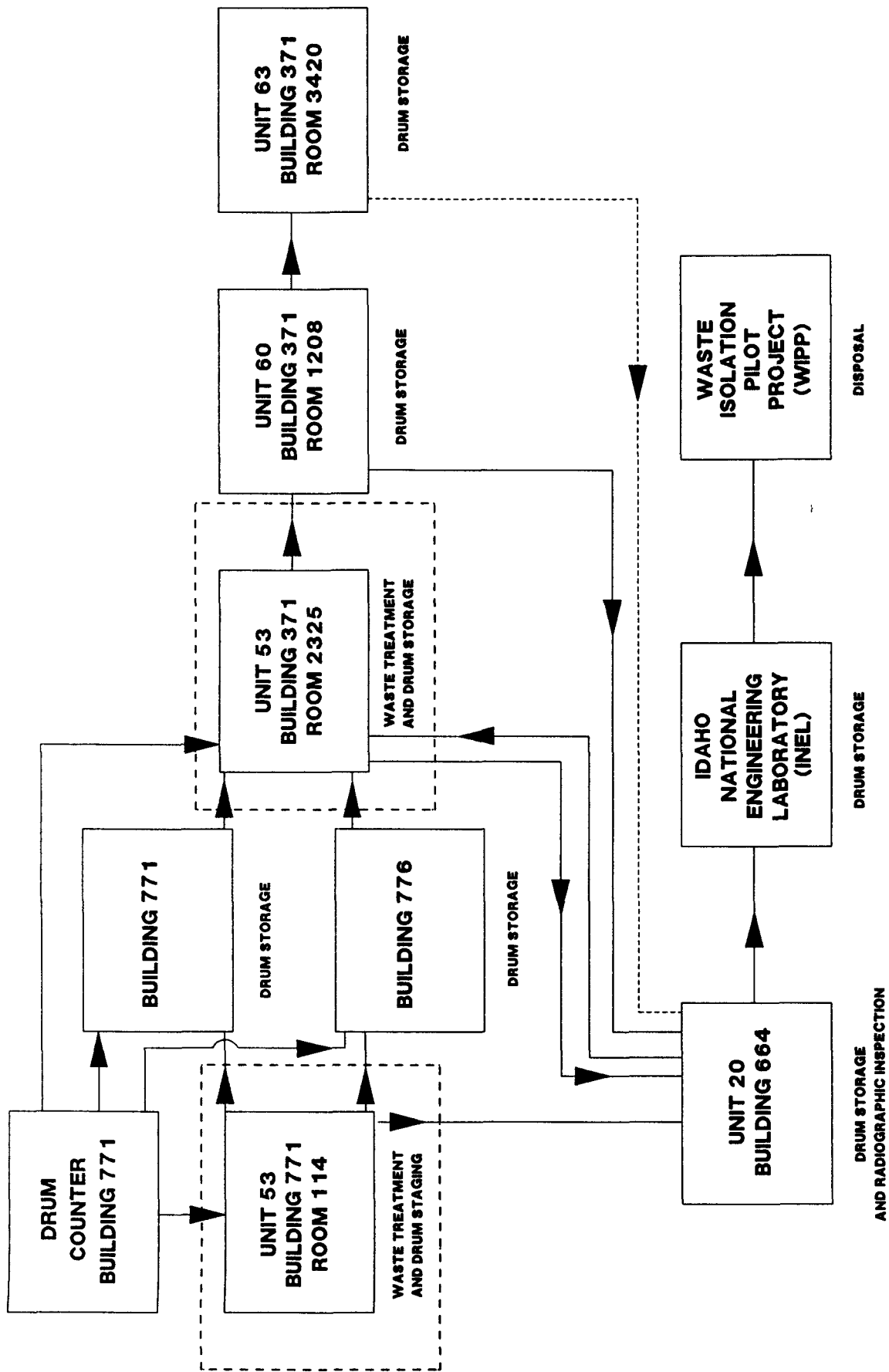
mixed wastes stored in Unit 53 based on process knowledge:

o	1,1,1-Trichloroethane	-	200 ppm
o	Carbon Tetrachloride	-	25 ppm
o	1,1,2-Trichloro-1,2,2-		
	Trifluoroethane	-	200 ppm
o	Methylene Chloride	-	100 ppm
o	Methyl Alcohol	-	15 ppm
o	Xylene	-	50 ppm
o	Butyl Alcohol	-	10 ppm
o	Lead	-	400 ppm

2.2.4 Waste Process Description

Figure 5 shows the waste handling, treatment, storage and disposal process for TRU mixed wastes during the last 19 years. Between approximately 1970 and spring of 1985 when cementation at the Plant temporarily ceased, Unit 53, Room 114, Building 771 was used to conduct waste treatment/cementation in Glovebox No. 2 and containerization and storage in Room 114. In January of 1986, the cementation process was resumed in Unit 53, Room 2325, Building 371, and continued until April 1987, when cementation at the Plant was terminated. Cemented wastes from both units were transported to Unit 20, Building 664, where Real-Time Radiography inspections were performed to confirm that drums did not contain free liquids. Drummed wastes were then shipped to the Idaho National Engineering Laboratory (INEL) for storage, awaiting eventual disposal at the Waste Isolation Pilot Project (WIPP) in New Mexico.

During the period of time between the end of cementation operations in Building 771 and the beginning of operations in Building 371, wastes awaiting cementation were accumulated and stored in the following locations:



CONTAINERIZATION, STORAGE, STABILIZATION, AND DISPOSAL PROCESS

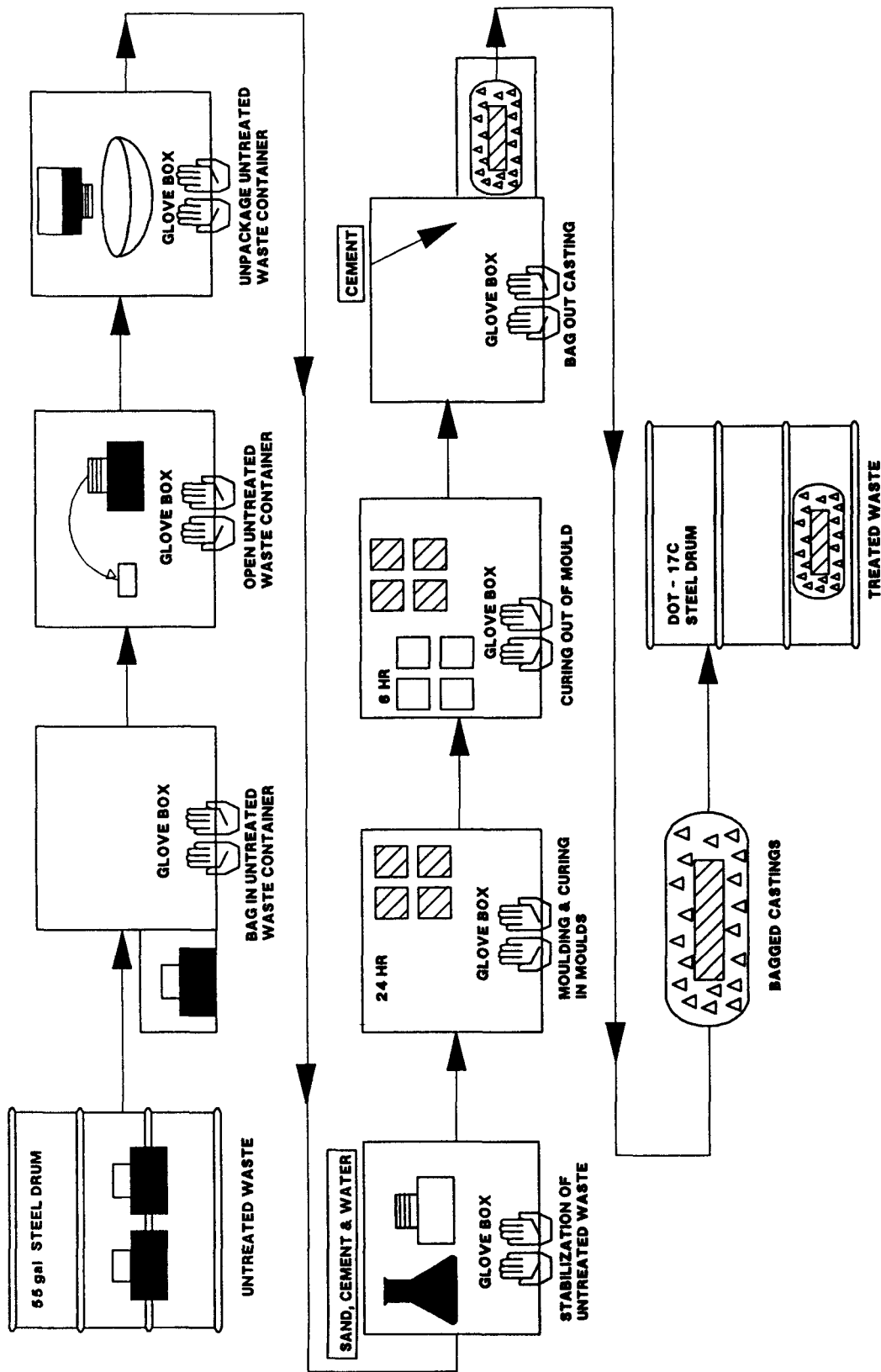
- o Building 771
- o Building 776
- o Building 664
- o Building 371

Upon initiation of cementation operations in Building 371, the backlog of drums stored in the above locations was gradually removed.

Building 371, Room 2325, was used for storage of the waste awaiting cementation during the period from January 1987 until April/May of 1988. The drums that had been stored in Building 371, Room 2325, and the drums of waste awaiting future cementation, were moved to Building 371, Room 1208, Unit 60, and from there moved to Building 371, Room 3420, Permitted RCRA Storage Area No. 63.

Drums of waste materials were received in Unit 53 (Room 114, Building 771, and Room 2325, Building 371) to await treatment/cementation. The wastes, packaged in two or four-liter polyethylene bottles inside 55-gallon capacity steel drums, included incinerator ash and sludge, ion exchange resin, and filter sludge. The sealed bottles of waste were bagged into Glovebox 2 in Room 114 of Building 771, and Glovebox 7 or 9 in Room 2325 of Building 371, where they were opened and unpackaged. A maximum of one-half drum of raw waste (approximately 50 pounds) was treated in each glovebox during one treatment event. As a result of treatment, one drum of raw waste would produce three drums of cemented waste.

Figure 6 shows a flow diagram of the cementation process, which was essentially the same for both treatment sites. The procedures for cementing the resin and sludge differ slightly. Resin was first washed with water and filtered to remove residual plutonium. Two liters of filtered resin were placed in a stainless steel mixing



TREATMENT PROCESS - UNIT 53

bowl with 1.5 liters of Portland cement. The material was mixed with a power mixer for approximately one minute into a thick concrete slurry. When cementing sludges, two liters of Portland cement, one half liter of masonry sand and one liter of water were mixed into a slurry before slowly adding one liter of sludge. This mixing sequence prevented the sludge from balling up and resulted in uniform mix. Additional water or cement was added to resin or sludge slurries to achieve the desired consistency. After thoroughly mixing the cement/resin or cement/sludge slurries, they were stirred with a spatula or similar tool and poured into a polyethylene mold. After the concrete cured for 24 hours, it was removed from the mold and allowed to cure an additional 4 to 6 hours. The inspected and accepted cemented wastes were placed in polyvinyl chloride (PVC) bags along with additional dry cement and bagged-out into Department of Transportation (DOT) 17C 55-gallon capacity steel drums for shipment to an off-site disposal facility. Consistency in the solidification process was maintained by strict adherence to procedures, and by visual and Real-Time Radiography (RTR) inspections of the waste.

Glovebox Construction and Operation

Gloveboxes are constructed of metal and glass, and equipped with glove ports, bag ports, and drum ports. A negative pressure is maintained inside gloveboxes. Exhaust is vented through a series of High Efficiency Particulate (HEPA) filters prior to atmospheric discharge. Materials are taken into and out of the gloveboxes through bag ports and drum ports without ever being exposed to the outside environment. The glove ports are equipped with gloves which are used to handle materials inside the glovebox under totally enclosed conditions. Standard operating procedures associated with gloveboxes include glove changes, bag in/bag out operations, and drum change operations. These procedures are described below.

Glove Changes

Gloves are inspected and changed on a routine schedule or when gloves show unusual wear. Glovebox ports are fitted with an inner band, outer band, and glove or a glove port cover. During a glove change out procedure, the inner band and outer band are removed and the glove is loosened from the port but not removed. A new glove is placed on a glove change ring and laced over the existing glove. The existing glove is then pulled off the glove port from the inside of the glovebox by the other hand. The new glove is then secured to the glove port. This glove change procedure ensures that the glove box is never opened to the environment and remains at all times a totally enclosed unit.

Bag-In/Bag-Out Operations

The gloveboxes are also totally enclosed during bag-in/bag-out and drum change operations. Gloveboxes are fitted with ports larger than glove ports on which long PVC bags are fitted. A rubber "O"-ring at the end of each bag is clamped securely onto each port. During a bag-out operation, the material inside the glovebox is placed into a bag and taped closed. The package is then placed into the PVC bag connected to the bag port. The PVC is then twisted until a compressed section of appropriate length is obtained. This section of the bag is taped tightly with plastic tape. Procedures are followed to ensure that the appropriate length is taped. The center of the taped section is then cut, effectively removing the bag from the glove box while maintaining a totally enclosed environment. The remaining section of bag may be used for several more bag-in/bag-out operations.

During a bag change, the bag port cover and inner and outer retainer bands are removed. The mouth of the existing bag is loosened from the front of the bag port, and the new bag is placed

over the existing bag. After securing the new bag onto the port, the existing bag is pulled off of the port and into the glove box. The inner and outer retainer bands and bag port cover are then put back in place. A totally enclosed environment is maintained during the entire operation.

Drum Holding, Building 771

Room 114 of Building 771 was needed for temporary holding of waste awaiting cementation from approximately 1970 until the spring of 1985. Drums were transported into Unit 53 from the drum counting facility located in Building 771. Drums were transported by forklift and/or drum dolly down 20 feet of a 10-foot-wide hallway from the drum counting area into Room 114. The maximum period of holding for individual drums was approximately two weeks, and averaged a few days. In the spring of 1985, untreated drums of waste from Room 114 and newly generated waste was moved to other locations in Building 771, Building 776, Unit 20 (Building 664) and Building 371 for storage.

Drum Storage, Building 371

Room 2325 was also needed for storage of waste awaiting cementation from January 1987 until April/May 1988. Drums were transported from Buildings 771, 776, 664, and other locations in Building 371 to the ground floor loading dock No. 18T of Building 371. Drums were transported by forklift and/or drum dolly from the loading dock 50 feet to Elevator No. 1. From Elevator No. 1, drums were moved down 40 feet of hallway to the Room 2325 drum storage area (Figure 4). The maximum period of storage for individual drums was approximately two weeks. In April/May 1988, drums stored in Room 2325 were moved to Unit 60, Room 1208 in Building 371 for storage.

2.2.5 Monitoring and Containment Systems

Gloveboxes function as totally enclosed treatment units. Direct physical contact with the wastes is precluded by the contained nature of the unit and the glove-handling mechanism. A negative air pressure is maintained within the box, thereby removing inhalation as a potential contaminant pathway to glovebox operators. Monitoring and containment systems or features of the area outside of the gloveboxes are presented below for each storage treatment site.

Building 771, Room 114

Drums held in Room 114 of Building 771 were placed in an area measuring 22 feet by 3 feet (Figure 3). The floor of Room 114 is constructed of concrete sealed with epoxy paint. A 2-inch high containment berm exists at each doorway. The areas outside of the glovebox were generally monitored monthly by the Radiation Monitors for 1) penetrating radiation, gamma and neutron, with hand-held instruments; and 2) for alpha contamination by swipes. Decontamination was to be conducted for any area in which alpha contamination exceeded 250 counts per minute on a 55 cm² swipe. Any area with elevated penetrating radiation was posted, as were all gloveboxes.

Building 371, Room 2325

Drums stored in Room 2325 of Building 371 were placed in a caged area measuring 21.5 feet by 41 feet (Figure 4). The floor of Room 2325 is constructed of concrete sealed with epoxy paint. A 2-inch containment berm exists at each doorway. The areas outside of the gloveboxes were generally monitored monthly by the Radiation Monitors using the procedures described above for Building 771.

2.2.6 Releases

No known releases have occurred from the TRU cementation wastes treated or stored in Unit 53 (Building 771 or Building 371). Any radioactive and/or hazardous releases identified from the unit would have been cleaned up according to standard methodologies (Rockwell International, 1979).

3.0 INTERIM STATUS CLOSURE PLAN SUMMARY

3.1 Closure Objectives

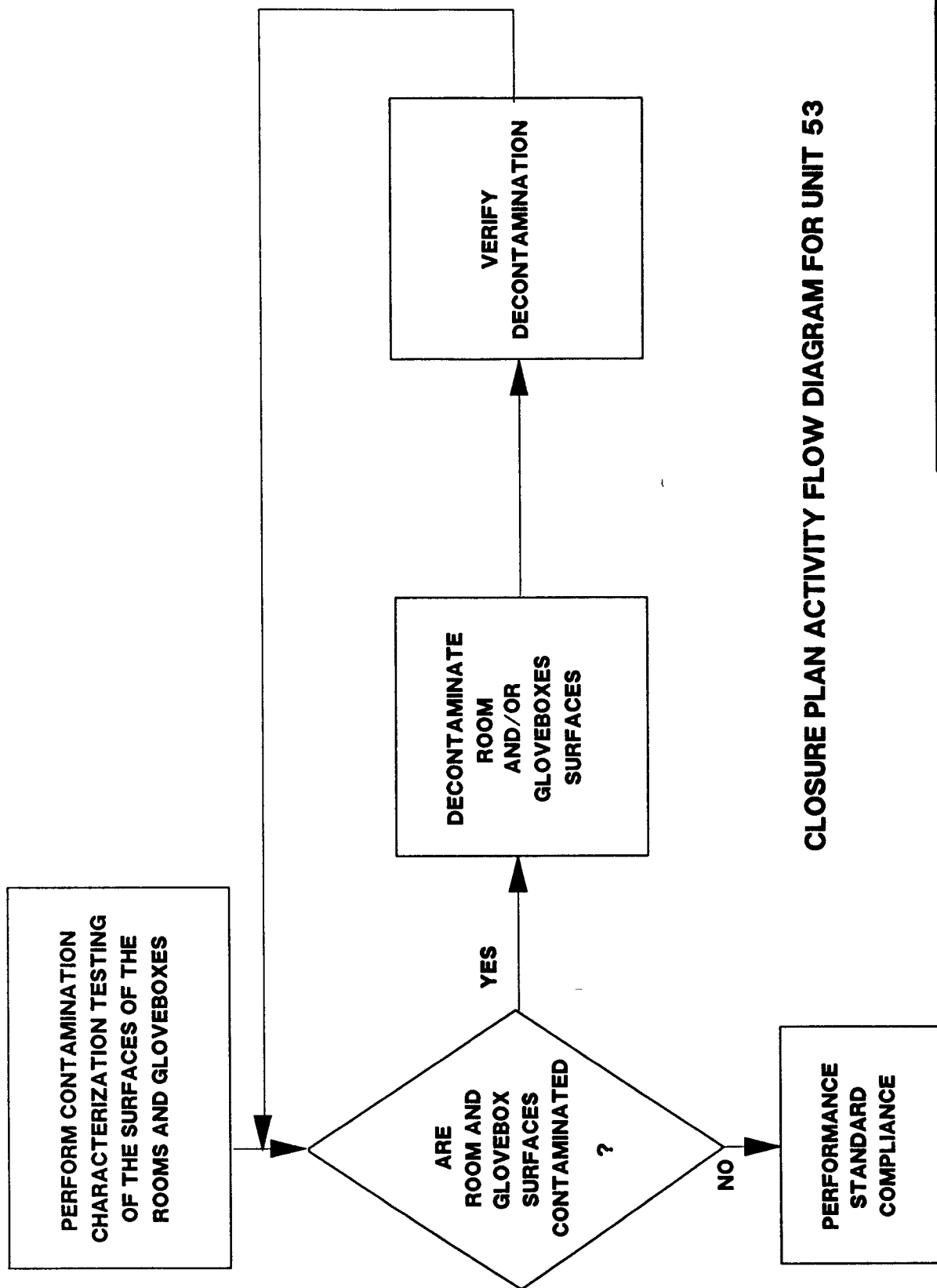
This interim status closure plan has been prepared to meet the performance standards of 6 CCR 1007-3, Section 265.111. The promulgated standards require a facility be closed in a manner that:

- o Minimizes the need for further maintenance; and
- o Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

3.2 Closure Plan

The progression of activities necessary to complete closure are shown in Figure 7. Principal activities include:

- o Characterization of contamination in Room 114 of Building 771 including Glovebox 2, and in Room 2325 of Building



CLOSURE PLAN ACTIVITY FLOW DIAGRAM FOR UNIT 53



UNIT 53
INTERIM STATUS CLOSURE PLAN
ROCKY FLATS PLANT
GOLDEN, COLORADO

FIGURE 7

371 including Gloveboxes 7 and 9 to determine the extent of decontamination required,

- o Decontamination of surfaces and gloveboxes (if required),
- o Decontamination verification (if required), and
- o Performance Standard Compliance.

It is believed that compliance with the performance standards can be currently achieved at Unit 53. As shown in Figure 7, the results of testing the surfaces of the rooms and gloveboxes to characterize the magnitude and extent of contamination will determine whether or not decontamination procedures are required. If decontamination is determined to be impracticable, then an amended closure plan will be submitted within 30 days of this unexpected event.

Glovebox 2 in Room 114, Building 771 and gloveboxes 7 and 9 in Room 2325, Building 371 have already been "zeroed out". This means that the materials in process, tools, and other miscellaneous material were all "bagged-out" of the gloveboxes; the gloveboxes were washed down; and the outside of the box was monitored for penetrating radiation. The gloveboxes were cleaned until the penetrating radiation was at background levels. Therefore, although no tests were performed relative to hazardous wastes, it is possible that the gloveboxes are presently in compliance with proposed closure performance standards (Section 6.1).

There are currently believed to be no contaminated soils requiring disposal or decontamination, due to the contained nature of the gloveboxes and the room's epoxy-sealed concrete floor. The hazardous waste inventory from cementation activities stored on-site has been previously removed.

3.3 Closure Schedule

The CDH and the EPA Regional Administrator will be notified of the intent to close Unit 53, 45 days prior to beginning the closure. Decontamination of each of the units will be accomplished within 90 days from the beginning of closure. The decontamination of equipment will require 10 additional days. An additional 90 days will be required prior to receipt of analytical results.

Assuming the units are shown to be sufficiently clean after one decontamination, closure will be certified 180 days after closure plan approval. If the analysis of the final rinse solution indicates contamination is still present above the performance standards, the closure schedule will be revised within 30 days of this finding.

3.4 Administration of Interim Status Closure Plan

The interim status closure plan for the Unit 53 treatment and storage facilities will be maintained at the Rocky Flats Area Office, Building 115, U.S. Department of Energy. The person responsible for storing and updating this copy of the closure plan is:

Mr. Albert E. Whiteman, Area Manager
U.S. Department of Energy
Rocky Flats Plant
P.O. Box 928
Golden, Colorado 80402
Phone: 303 966-2025

4.0 REMOVAL OF HAZARDOUS WASTE INVENTORY

4.1 Building 771, Room 114

As of the spring of 1985, all TRU mixed waste associated with the cementation process in Room 114 was removed and stored in: Building 771, Building 776, Unit 20-Building 664 and Building 371. Therefore, Unit 53, Building 771 currently contains no remaining hazardous waste inventory associated with the cementation process which requires removal.

4.2 Building 371, Room 2325

As of April/May 1988, all TRU mixed waste associated with the cementation process in Room 2325 was removed and stored in Unit 60, Building 371, Room 1208. Therefore, Unit 53, Building 371 currently contains no remaining hazardous waste inventory associated with the cementation process which requires removal.

5.0 OFF-SITE WASTE MANAGEMENT

The only TRU waste residues requiring disposal from either storage treatment site will be rinsate from possible decontamination activities. It is anticipated that the relatively small quantity of rinsate generated can be disposed on-site at the Building 374 treatment facility. Currently, there is no authorized off-site waste management facility available in which to dispose of contaminated equipment used during decontamination activities. It is assumed that such a site will be available at the time of closure, however, pertinent details of the facility's location and operations are presently unknown.

6.0 DECONTAMINATION

6.1 Performance Criteria

Decontamination of rooms, gloveboxes, ancillary items and cleaning equipment will be conducted such that residual levels of hazardous constituents are found to be less than or equal to ten times the suggested-no-adverse-response-levels (SNARL). The following hazardous waste constituents known to have occurred in the stored drums will serve as indicator parameters:

<u>Parameter</u>	<u>10 X SNARL</u>
1,1,1-Trichloroethane	2 mg/l
Carbon Tetrachloride	0.71 mg/l
Methylene Chloride	3.5 mg/l
Xylene	4.4 mg/l

The Remaining hazardous waste constituents listed in Section 2.2.3 (methyl alcohol, butyl alcohol and lead) were not selected as indicator parameters due to their possible existence in the decontamination solvents and unit construction materials. In addition, 1,1,2-trichloro-1,2,2-trifluoroethane was not selected as an indicator parameter because no standard EPA method exists for analysis.

The SNARL (EPA, various dates) concentrations were selected as appropriate hazardous constituent concentration limits because they were developed as water quality goals in an effort to protect human health and the environment. If the transport mechanism of the contaminant is expected to be through the hydrogeologic regime and the point of exposure is contact with these waters, the SNARL is an appropriate concentration for use as a basis for the performance standards associated with the solid or liquid sources which may be

found at the facility undergoing closure. The above transport and exposure mechanism is the expected scenario.

The Extraction Procedure Toxicity concentrations are intended to provide an idea of the concentration of the leachate that would be generated due to a given waste matrix. There remains a question of what will happen to the leachate before it reaches the point of environmental exposure. To accommodate the attenuation in concentration that can be expected to occur as the waste passes through the soil beneath the waste matrix into the groundwater and ultimately to a drinking water source, the EPA (EPA, 1980) formulated a dilution factor designed to account for expected attenuation in the hydrogeologic regime. This attenuation factor was based on the following assumptions:

- o The waste is situated over an aquifer that is a source of drinking water;
- o The soil below the facility is composed of material with limited attenuative capacity; and
- o Persons using the aquifer as a source of drinking water are supplied from a well situated 500 feet downgradient from the waste matrix.

On the basis of the information presented above, the EPA selected an attenuation factor of 100 as a revision to their original selection of an attenuation factor of 10.

Working in an upgradient direction from the receptor to the source, the SNARL concentrations may be multiplied by a factor of 100 to determine the closure performance standard. However, adopting a conservative approach, an attenuation factor of 10 was used to

establish performance standards for the decontamination activities associated with closure of this unit.

With respect to radioactive contamination, the levels of fixed and removable activity will determine if cleaning/recleaning is required, or if the unit can be used in its current condition. Decontamination will be considered complete when:

- o The direct count does not exceed 1000 disintegrations per minute (dpm) per 100 cm² of total alpha activity, as measured with an air-proportional alpha survey instrument, and
- o The removable alpha activity does not exceed 20 dpm per 100 cm² as measured from smears with filter paper counted on a scintillation instrument.

6.2 Decontamination of Rooms and Gloveboxes

Prior to initiation of decontamination procedures, wipe sampling will be performed on the surfaces of Room 114, Building 771 including Glovebox 2, and Room 2325, Building 371 including Gloveboxes 7 and 9 to determine if sufficient contamination exists to necessitate decontamination activities. Sampling/testing will be conducted using EPA-approved procedures and minimum detection levels. Testing for hazardous materials will involve measuring the concentrations of the indicator parameters identified in Section 6.1. A wipe sample which has not been used to sample the surfaces of the unit will be analyzed for those hazardous constituents listed in Section 6.1, and these results will be considered as background levels. Those wipe samples used to sample the surfaces of the unit will also be analyzed for those hazardous constituents listed in Section 6.1, and the difference in concentrations between these two results will be compared to the performance standards

listed in Section 6.1. Should the adjusted sample concentrations exceed the performance standards, the decontamination measures listed below will be initiated.

To characterize the contamination of radioactive substances, measurements will be taken to determine levels of fixed and removable radioactivity. Total alpha activity levels of the unit will be measured with an air-proportional-type alpha survey meter. Smears will be taken and counted according to plant procedures to determine the level of removable activity. The levels of total and removable alpha activity will determine if the unit requires cleaning, or if it can be used in its current condition.

If wipe sampling indicates decontamination is required, the surfaces in Room 114 and/or 2325 will be cleaned by one of several commonly implemented methods, including hydroblasting/water wash or foam cleaning. If wipe sampling indicates decontamination is required, the surfaces within Gloveboxes 2, 7 and 9 will be cleaned by hand washing and rinsing the surfaces of the gloveboxes. A triple wash/rinse cycle with "SOLNI" or an equivalent available solution will be used. This solution is effective in removing TRU mixed wastes. The cleaning solutions, wash, and rinsate will be collected by a vacuum unit following decontamination efforts related to the room surfaces. Sorbent materials will be used to collect cleaning solutions, wash, and rinsate in the gloveboxes, and bagged out following decontamination efforts.

Prior to initiation of decontamination activities, a "rinsate" sample will be collected for analysis of those hazardous parameters listed in Section 6.1, and these results will be considered as background levels. Following the decontamination efforts, "rinsate" samples will be collected and analyzed for those hazardous constituents listed in Section 6.1, and the difference in concentration between these two results will be compared to the

performance standards listed in Section 6.1. The unit will be judged to meet the performance standards if the adjusted concentration of the "rinsate" is below the performance standard concentrations.

6.3 Decontamination of Auxiliary Equipment

There is no currently identifiable auxiliary equipment which was used at Unit 53, Buildings 771 or 371.

6.4 Decontamination of Equipment Used During Closure

Upon completion of each phase of decontamination required for closure, equipment will be decontaminated by steam cleaning at a designated washdown area located in the room before being sent to another decontamination site or before leaving the plant site. Decontamination will include:

1. A rinse with a steam cleaner using water free of volatile organics.
2. Scrubbing with brushes using a solution of water with Liquinox detergent that is free of volatile organics.
3. A final rinse with the steam cleaner using water free of volatile organics.

Rinsate will be collected in approved containers and will be treated on-site at Building 374. Plastic sheets used in the decontamination area and all other disposable contaminated equipment accumulated during closure will be containerized and shipped to an authorized off-site disposal facility.

6.5 Contaminated Soils

Due to the containment features of the storage treatment facilities described in Section 2.2.5, there has been no known contamination of area soils as a result of drum storage or treatment in Unit 53.

6.6 Removal of Hazardous Waste Residues

Approximately 300 gallons and 150 gallons of waste may be generated by decontamination processes performed in Room 114, Building 771, and Room 2325, Building 371, respectively. The waste will be collected and placed in 55-gallon drums or a tank truck. The effluent contained in the drums or tank truck will be transferred to Building 374 for treatment.

7.0 DECONTAMINATION VERIFICATION

7.1 Sampling Procedures

The success of decontamination procedures for hazardous materials will be measured by comparing the adjusted concentration of appropriate substances in rinsate with the performance standards listed in Section 6.1. Testing will be conducted using EPA-approved procedures and minimum detection levels.

In verification tests, a rinsate sample will be collected for analysis of those hazardous parameters listed in Section 6.1, and these results will be considered as background levels. Following the decontamination efforts, "rinsate" samples will be collected and analyzed for those hazardous constituents listed in Section 6.1, and the difference in concentration between these two results will be compared to the performance standards listed in Section 6.1.

The unit will be judged to meet the performance standards if the adjusted concentration of the rinsate is below the performance standard concentrations.

Decontamination rinsate sources will be grab-sampled after the preparation of the cleaning solution. A triple wash and rinse is expected to require less than 500 gallons of water, therefore only one sample of the rinsate source will be taken at each site. One sample of the used wash and rinse water will be collected, and this sample will be taken as a grab sample from the third rinse solution after collection in the vacuum unit during the wash and rinse activities at each site.

To verify the decontamination of radioactive substances, measurements will be taken to determine levels of fixed and removable radioactivity. Total alpha activity levels of the unit will be measured with an air-proportional-type alpha survey meter. Smears will be taken and counted according to plant procedures to determine the level of removable activity. The levels of total and removable alpha activity will determine if the unit will be recleaned, or if the unit is sufficiently decontaminated. The unit will be considered clean if the direct count does not exceed 1000 dpm per 100 cm² of alpha activity, and the removable alpha activity does not exceed 20 dpm per 100 cm².

7.2 Analytical Methods

The analytical methods to be used in evaluating the success of decontamination efforts, as documented in SW-846, are presented in Table 2 by indicator parameter. Radioactivity levels will be analyzed by using an air-proportional-type alpha survey meter (total alpha activity levels) and Smear activity measurements (removable activity).

TABLE 2
ANALYTICAL METHODS FOR
INDICATOR PARAMETERS

<u>PARAMETER</u>	<u>ANALYSIS METHOD</u>	<u>DETECTION LIMIT</u>
1,1,1-Trichloroethane	624-GC/MS for Volatile Organics	5 µg/l
Carbon Tetrachloride	624-GC/MS for Volatile Organics	5 µg/l
Xylene	624-GC/MS for Volatile Organics	5 µg/l
Methylene Chloride	624-GC/MS for Volatile Organics	5 µg/l

8.0 CLOSURE SCHEDULE

The CDH and the EPA Regional Administrator will be notified of the intent to close Unit 53, 45 days prior to beginning the closure. Decontamination of each of the units will be accomplished within 90 days from the beginning of closure. The decontamination of equipment will require 10 additional days. An additional 90 days will be required to allow for receiving analytical results.

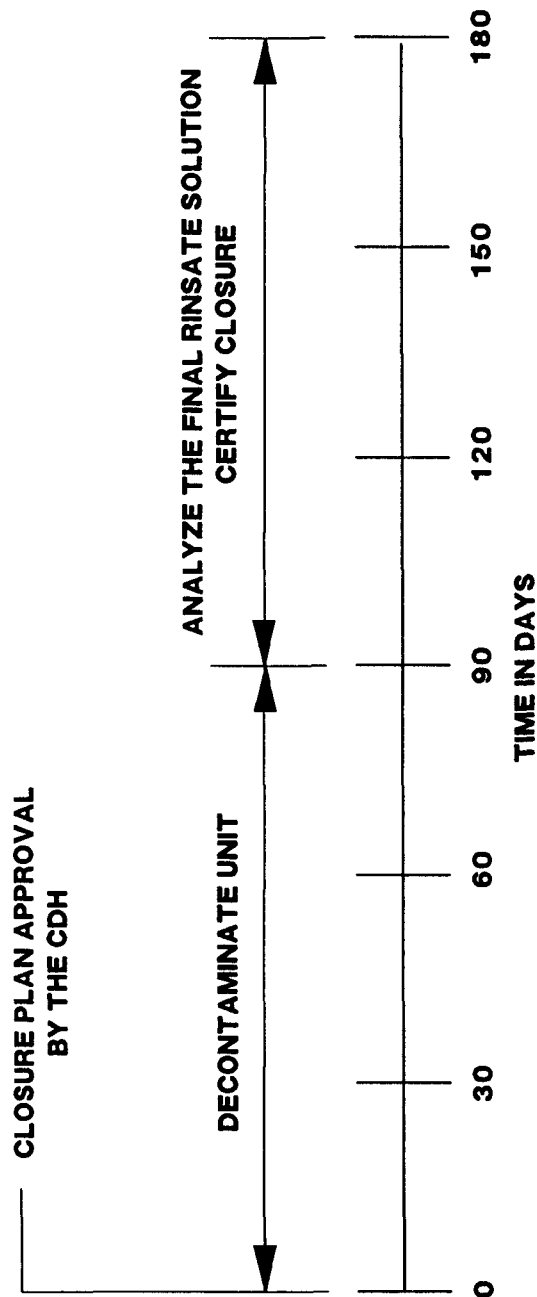
Assuming the unit is shown to be sufficiently clean after one decontamination, closure will be certified 180 days after closure plan approval (Figure 8). If the analysis of the final rinse solution indicates contamination is still present above the performance standards, the closure schedule will be extended to allow additional time for further decontamination and analysis.

Assuming that the unit is shown to be sufficiently clean after one decontamination effort, closure will be certified 180 days after closure plan approval.

9.0 CLOSURE COST AND FINANCIAL ASSURANCE

State and Federal governments are exempt from the financial requirements imposed by Subpart H of 6 CCR 1007-3, Section 265.140(c). Because the Rocky Flats Plant is a federally-owned facility, no cost estimates or financial assurance documentation is required. Cost estimates for each site are presented in Tables 3 and 4 for planning, budgeting and informational purposes. These estimates can in no way be considered binding.

The estimates presented in Tables 3 and 4 are based on a worst case scenario in which the entire unit undergoing closure is found to be contaminated. These assumptions are expected to result in an



**TYPICAL
SCHEDULE OF CLOSURE ACTIVITIES
UNIT 53, BUILDINGS 371 AND 771**

TABLE 3

COST ESTIMATE FOR CLOSURE OF UNIT 53, BUILDING 771, ROOM 114

Room 114 Surfaces

Engineering Design and Inspection	\$ 7,400.00
Equipment	10,000.00
Decontamination Monitoring	8,000.00
Disposal	2,000.00
Contingency	<u>4,000.00</u>
SUBTOTAL	\$31,400.00

Glovebox 2

Engineering Design and Inspection	\$ 2,250.00
Equipment	1,000.00
Decontamination Monitoring	2,000.00
Disposal	500.00
Contingency	<u>1,000.00</u>
SUBTOTAL	\$ 6,750.00

TOTAL UNIT 53	\$38,150.00
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TABLE 4

COST ESTIMATE FOR CLOSURE OF UNIT 53, BUILDING 371, ROOM 2325

Room 2325 Surfaces

Engineering Design and Inspection	\$ 3,700.00
Equipment	5,000.00
Decontamination Monitoring	4,000.00
Disposal	1,000.00
Contingency	<u>2,000.00</u>
SUBTOTAL	\$15,700.00

Gloveboxes 7 and 9

Engineering Design and Inspection	\$ 4,500.00
Equipment	2,000.00
Decontamination Monitoring	4,000.00
Disposal	1,000.00
Contingency	<u>2,000.00</u>
SUBTOTAL	\$13,500.00

TOTAL UNIT 53	\$29,200.00
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overestimation of the actual costs that will be incurred, since this unit is expected to be clean.

10.0 SITE ACCESS AND SECURITY

Access to the work areas will be limited to authorized personnel only. Exit from the working areas will be through a clean, restricted area in the decontamination area. Existing security measures at the Rocky Flats Plant meet the requirements of 6 CCR 1007-3, Section 265.14. These include:

- o A three-strand barbed-wire cattle fence surrounding the facility posted to identify the land as a government reservation/restricted area,
- o A fence and armed guards posted 24 hours daily at two gates to the controlled area of the facility, and
- o Surveillance by security cameras 24 hours daily.

Existing fences and gates are operated and maintained by DOE. Maintenance requirements will be performed by DOE regardless of closure activities at the sites.

11.0 HEALTH AND SAFETY

A site-specific Health and Safety Plan, covering decontamination and closure of the sites, will be submitted to the CDH two months before closure activities begin. The plan will comply with all Occupational Safety and Health Administration (OSHA), CDH, EPA, and DOE requirements.

12.0 POST-CLOSURE MONITORING

The implementation of unit-specific post-closure monitoring is not expected to be necessary due to the contained nature of the storage/treatment facility. However, monthly surface contamination surveys and gamma/neutron surveys will be conducted as part of routine radiological monitoring (Rockwell International, 1989a, 1989b).

13.0 CLOSURE CERTIFICATION

After completion of closure, the owner or operator and an independent certified registered engineer will submit certification of closure, based upon compliance with the closure plan, to the CDH and the EPA Regional Administrator.

The independent registered professional engineer will periodically review the closure operations in enough detail to assure final certification of closure. The final certification of closure will state that the closure procedures and standards have been carried out as described in the approved closure plan. In order to certify the performance and completion of closure activities, the independent registered professional engineer will review test results and inspect the sites to verify the closure plan was carried out as approved. Both the operator and the independent registered professional engineer will submit a written document to the CDH and the EPA Regional Administrator to certify closure activities were conducted in accordance with the approved closure plan.

14.0 REFERENCES

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